Catalase in PBS is mixed with the prepolymer in the following formulation:

PEG DA (MW 10000)	35%
PEG DA (MW 1000)	5%
PBS	60%

with 2,2-dimethoxy, 2-phenyl acetophenone at 1.6% of the above solution.

This solution is placed in mineral oil at a ratio of 1 part catalase/prepolymer solution to 5 parts mineral oil and is rapidly agitated with a motorized mixer to form an emulsion. This emulsion is illuminated with a long-wavelength ultraviolet light (360 nm) for 5 min to crosslink the PEG prepolymer to form a gel. The mw of the prepolymer may be selected to resist the diffusion of the catalase from the gel, with smaller PEG DA molecular weights giving less diffusion.

PEG DA of MW 10,000, further crosslinked with PEG DA 1000, should possess the appropriate permselectivity to restrict catalase diffusion, and it should possess the appropriate permselectivity to permit the diffusion of hydrogen peroxide into the gel-entrapped catalase to allow the enzymatic removal of the hydrogen peroxide from the bloodstream. Furthermore, it should possess the appropriate biocompatibility to circulate within the bloodstream.

In this way, the gel is used for the controlled containment of a bioactive agent within the body. The active agent (enzyme) is large and is retained within the gel, and the agent upon which it acts (substrate) is small and can diffuse into the enzyme rich compartment. However, the active agent is prohibited from leaving the body or targeted body compartment because it cannot diffuse out of the gel compartment.

EXAMPLE 26

Cellular Microencapsulation for Evaluation of Anti-Human Immunodeficiency Virus Drugs In Vivo.

HIV infected or uninfected human T-lymphoblastoid cells can be encapsulated into PEG gels as described for other cells above. These microcapsules can be implanted in a nonhuman animal to create a test sytem for anti-HIV drugs, and then treated with test drugs such as AZT or DDI. After treatment, the microcapsules can be harvested and the encapsulated cells screened for viability and functional normalcy using a fluorescein diacetate/ethidium bromide live/dead cell assay. Survival of infected cells indicates successful action of the drug. Lack of biocompatibility is a documented problem in this approach to drug evaluations, but can be overcome by using the gels described herein.

Modifications and variations are obvious from the foregoing detailed description. Such modifications and variations are intended to come within the scope of the following claims.

We claim:

1. A method for encapsulating, sealing, coating or supporting a biological material comprising:

a) contacting a solution of a non-toxic free radical polymerization initiator selected from the group consisting of visible or long wavelength ultraviolet light-activatable free radical initiators, thermal activatable free-radical initiators with a biological material selected from the group consisting of mammalian cells, components of mammalian cells, aggregates of mammalian cells, and mammalian tissues, to allow binding of the initiator to the biological material;

b) removing the unbound initiator;

c) adding to the biological material a water soluble biocompatible macromer comprising at least two free radical polymerizable end groups, wherein the macromer is non-toxic and has a molecular weight of at least 400, and

d) exposing the mixture to an agent activating the initator to cause polymerization of the macromers to form a polymeric gel with a degree of polymerization greater than 10.

2. The method of claim **1** further comprising adding to the biocompatible macromer a biologically active molecule selected from the group consisting of peptides of less than one hundred amino acids, proteins of one hundred or more amino acids, polysaccharides, nucleic acids, organic drugs, and inorganic drugs.

3. The method of claim **1** wherein the free-radical polymerizable endgroups contain carbon-carbon double or triple bonds.

4. The method of claim **1** wherein the water soluble macromer is selected from the group consisting of poly(ethylene glycol), poly(ethylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(amino acid), polysaccharides, proteins, or a block or random copolymer thereof comprising two or more polymerizable substituents.

5. The method of claim **4** wherein the polysaccharide is selected from the group consisting of alginate, hyaluronic acid, chondroitin sulfate, dextran, dextran sulfate, heparin, heparin sulfate, heparan sulfate, chitosan, gellan gum, xanthan gum, guar gum, and K-carrageenan.

6. The method of claim **4** wherein the protein is selected from the group consisting of gelatin, collagen and albumin.

7. The method of claim **1** wherein the free-radical polymerizable endgroups are selected from the group of macromers containing two or more acrylate groups.

8. The method of claim **1** wherein the polymer is prepared from macromers comprising an acrylate terminated poly(ethylene glycol).

9. The method of claim **1** wherein the polymerization initiator is selected from the group consisting of an eosin dye, riboflavin, acetophenone, a substituted acetophenone, a fluorescein dye camphorquinone, rose bengal, methylene green, methylene blue, acridine orange, xanthine dye, and thioxanthine dyes.

10. The method of claim **1** wherein the polymerization initiator is selected from the group consisting of erythrosin, phloxine, and thionine.

11. The method of claim **1** wherein polymerization is initiated by visible light having a wavelength of less than 800 nm.

12. The method of claim **11** wherein the light has a wavelength of 514 nm.

13. The method of claim **1** wherein the unbound initiator is removed by dilution with the macromer solution such that polymerization occurs only at the surface of the mammalian cell, mammalian cell aggregate, or mammalian tissue.

14. The method of claim **1** wherein polymerization of the macromer solution adheres mammalian tissue to other mammalian tissue or cells.

15. The method of claim **1** wherein the initiator is a photoinitiator which is activated by exposure to visible light, and the water soluble macromer is selected from the group consisting of poly(alkylene glycol), poly(alkylene oxide), poly(vinyl alcohol), poly(vinylpyrrolidone), poly(ethyloxazoline), poly(amino acid), polysaccharides, proteins, or a block or random copolymer thereof comprising two or more polymerizable substituents.

16. The method of claim **15** wherein the macromer is poly(ethylene glycol) and the free radical polymerizable groups contain carbon-carbon double bonds.

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